

Application No.: 09/914,356
Amendment under 37 CFR 1.111
Reply to Office Action dated April 21, 2004
August 23, 2004

AMENDMENTS TO THE CLAIMS

Please substitute the following claims for the pending claims with the same numbers respectively:

Claim 1 (Currently amended): A metal chelate-forming fiber ~~characterized in that~~ comprising at least one metal chelate forming compound selected from the group consisting of aminocarboxylic acid, aminodicarboxylic acids, thiocarboxylic acid and phosphoric acid which are reactive to an epoxy group, is bonded to a fiber molecule of a natural fiber or regenerated fiber through a graft reaction product of a crosslinkable compound which has a reactive double bond and a glycidyl group in its molecule; and

wherein said metal chelate-forming fiber includes a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group.

Claim 2 (Original): The metal chelate-forming fiber according to claim 1, wherein said crosslinkable compound is at least one selected from the group consisting of glycidyl methacrylate, glycidyl acrylate and allyl glycidyl ether.

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Claim 3 (Previously presented): The metal chelate-forming fiber according to claim 1, wherein said metal chelate forming compound is at least one selected from the group consisting of iminodiacetic acid, ethylenediaminediacetic acid, ethylenediaminetriacetic acid, thioglycolic acid, thiomalic acid and phosphoric acid.

Claim 4 (Original): The metal chelate-forming fiber according to claim 3, wherein said metal chelate forming compound is iminodiacetic acid, ethylenediaminetriacetic acid or thioglycolic acid.

Claim 5 (Previously presented): The metal chelate forming fiber according to claim 1, wherein said natural or regenerated fiber is a vegetable fiber.

Claim 6 (Previously presented): The metal chelate-forming fiber according to claim 5, wherein said vegetable fiber is a cellulosic fiber.

Claim 7 (Previously presented): The metal chelate-forming fiber according to claim 1, wherein said natural fiber is an animal fiber.

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Claim 8 (Previously presented): The metal chelate-forming fiber according to claim 1, wherein said fiber is powdery.

Claim 9 (Previously presented): The metal chelate-forming fiber according to claim 1, wherein said fiber is a filter material.

Claim 10 (Currently amended): A process for producing a metal chelate-forming fiber, comprising the steps of:

subjecting a crosslinkable compound having a reactive double bond and a glycidyl group in its molecule to graft reaction with a fiber molecule of a natural or regenerated fiber using a redox catalyst; and

allowing the resulting graft reaction product to be bonded with at least one metal chelate-forming compound selected from the group consisting of aminocarboxylic acid, aminodicarboxylic acids, thiocarboxylic acids and phosphoric acid which are reactive with an epoxy group, to form a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group.

Claim 11 (Original): The process according to claim 10, wherein said crosslinkable compound is at least one selected from the group

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consisting of glycidyl methacrylate, glycidyl acrylate and allyl glycidyl ether.

Claim 12 (Previously presented): The process according to claim 10, wherein said metal chelate forming compound is at least one selected from the group consisting of iminodiacetic acid, ethylenediaminediacetic acid, ethylenediaminetriacetic acid, thioglycolic acid, thiomalic acid and phosphoric acid.

Claim 13 (Previously presented): The process according to claim 10, wherein said redox catalyst is a combination of a divalent iron salt, hydrogen peroxide and thiourea dioxide.

Claim 14 (Original): The process according to claim 13, wherein the natural or regenerated fiber is previously treated with the divalent iron salt and is then applied with the hydrogen peroxide and thiourea dioxide to thereby perform the graft reaction.

Claim 15 (Currently amended): A method of capturing metal ions, comprising the steps of:

~~bringing the~~ providing a metal chelate-forming fiber comprising at least one metal chelate-forming compound selected from the group consisting of aminocarboxylic acid, aminodicarboxylic acids,

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thiocarboxylic acid and phosphoric acid ~~which are reactive to epoxy group~~ is bonded to a fiber molecule of a natural fiber or regenerated fiber through a graft reaction product of a crosslinkable compound which has a reactive double bond and a glycidyl group in its molecule, wherein the metal chelate-forming fiber includes a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group; and

bringing the metal chelate-forming fiber into contact with an aqueous liquid containing metal ions to thereby capture the metal ions from the aqueous liquid.

Claim 16 (Currently amended): A method of capturing metal ions, comprising the steps of:

~~bringing the~~ providing a metal chelate-forming fiber comprising at least one metal chelate-forming compound selected from the group consisting of aminocarboxylic acid, aminodicarboxylic acids, thiocarboxylic acid and phosphoric acid ~~which are reactive to epoxy group~~ is bonded to a fiber molecule of a natural fiber or regenerated fiber through a graft reaction product of a crosslinkable compound which has a reactive double bond and a glycidyl group in its molecule, wherein the metal chelate-forming fiber includes a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group; and

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bringing the metal chelate-forming fiber into contact with an oily liquid containing metal ions to thereby capture the metal ions from the oily liquid.

Claim 17 (Currently amended): A method of capturing metal ions, comprising the steps of:

~~bringing the~~ providing a metal chelate-forming fiber comprising at least one metal chelate-forming compound selected from the group consisting of aminocarboxylic acid, aminodicarboxylic acids, thiocarboxylic acid and phosphoric acid ~~which are reactive to epoxy group is~~ bonded to a fiber molecule of a natural fiber or regenerated fiber through a graft reaction product of a crosslinkable compound which has a reactive double bond and a glycidyl group in its molecule, wherein the metal chelate-forming fiber includes a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group; and

bringing the metal chelate-forming fiber into contact with a gas containing metal ions to thereby capture the metal ions from the gas.

Claim 18 (Currently amended): A metal chelate fiber ~~characterized in that~~ comprising a metal is bonded by chelation to the metal chelate-forming fiber comprising at least one metal chelate-forming compound selected from the group consisting of

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aminocarboxylic acid, aminodicarboxylic acids, thiocarboxylic acid and phosphoric acid which are reactive to an epoxy group, is bonded to a fiber molecule of a natural fiber or regenerated fiber through a graft reaction product of a crosslinkable compound which has a reactive double bond and a glycidyl group in its molecule; and

wherein said metal chelate-forming fiber includes a metal chelate forming moiety having a hydroxyl group and an oxygen atom adjacent to a carbonyl group.